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Some Properties Of Cross Vortices and System of Cross Vortices

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Summary: *This article develops the effects and the results of the New Axioms and Laws, described in previous articles. Here is appointed a new approach, i.e. the opening of the closed vortices and the replacing the even with uneven movement. A number of very interesting properties and surprising mutual relationships appear, such as : the electric charge as a dynamic characteristic; the structure of the vacuum as a feed-back; the essence of the masses, as cross(transverse) vortices; the form of the two vortex elements as dynamics of an accelerating and a decelerating vortex; the eccentricity of the vortices of the two elements as a reason why the decelerating element rotates around the accelerating one; transformation of the linear movement into a cross vortex as the cause of a parasitic rotation (precession) of the two vortex elements around their axis, and others.*

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I. Introduction

The popular axiom guaranteeing Maxwell's laws states that the even motion of vector E leads to movement in a closed loop {div(rot E) = 0} [1]. The author replace this axiom with a new one, which states that the uneven movement of vector E results in an open loop{div(rot E) ≠ 0} [2]. The first article describes three axioms and four laws [3]. In the next article, that axiom describes an open vortex {div(Vor E) ≠ 0} ,is developed to three axioms and ten laws [4]. They lead to the following results: the even convergent movement is replaced by an uneven (decelerating or accelerating) and from a movement in 2D a movement in 3D is obtained; pairs of objects are constructed as transformations of uneven vortices (a decelerating into an accelerating and vice versa) and a movement in two resultant, mutually perpendicular closed loops in 3D is obtained [4]. In this article the descriptive approach of the essence of the phenomena is preferred, instead of using ready terms. This choice aims now to avoid the need for parallel and complicated explanations**. As well explained the former axiom {div(rot E) = 0} describes only the Electromagnetic field [5]. In this article, it is proven that the new axiom {div(rot E) □ 0 or div (Vor E) □ 0 } describes a more extended field, including the Gravity field.**

Definition : Gravity structures represent a design of elements and links between them founded on the axiom : **div(Vor E) □ 0 .**

Let's look at the main Gravity vortex pair: an accelerating transverse vortex (2) generated by a decelerating longitudinal vortex (8); longitudinal vortex connection (3); a decelerating transverse vortex (1) emitting an accelerating longitudinal vortex (7) (Figure 1) [3]. The reverse pair is not examined for now.

II. Properties And Characteristics Of The Pair Of Vortex Structures [2; P. 289-293] .

2.1. Charge of the two structures of transverse vortices.

Definition: The pair of transverse vortices (1) and (2) connected with longitudinal vortex (3) represent a sustainable system which we will call a sustainable pair (Figure 1).

Let's mark the two objects as an accelerating object (2), (a_2> 0) and a decelerating object (1), (a_1 <0) . Let's break the transverse link (3) between the two objects (1) and (2) , for example, in point 3 (p.3) . For instance let's put the accelerating object (2) in an electric field with two poles. Then the acceleration component (2), (a_2> 0) of Figure 1 , will be attracted by the negative pole, which will slow the movement (1), (a_1 <0). The cause is that the accelerating element(2) strives to form a sustainable pair with one of the excessive decelerating elements (1) and it looks as if it has a positive charge. If we put the decelerating vortex element (1) of Figure 1 in the electric field, it will move to the pole, which contains an excess of accelerating elements (2), (a_2>0) , i.e. to the positive pole. The cause is that the decelerating element (1) strives to form a sustainable pair with one of the excessive accelerating elements (2) and it looks as if it has a negative charge(Figure 1).

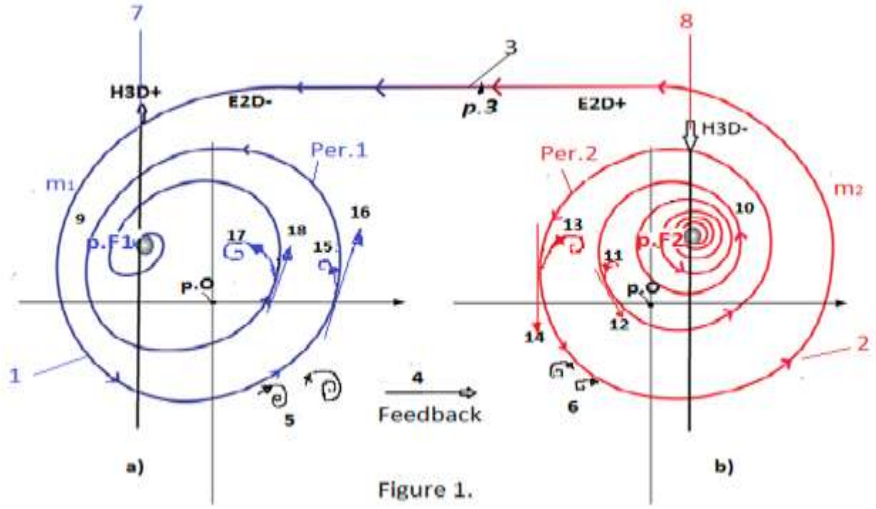

Figure 1.

<u>Conclusion:</u> *The charge of the open vortices is a dynamic feature of the cross (transverse) vortex and is proportional to the acceleration, which is the same, respectively at the output (p. 3 ;E2D+) of the accelerating (2) and the input (p. 3 ;E2D-) of the decelerating (1) vortex {Figure 1).* The charge is an essential expression of the structure, rather than its shape. This is an internal dynamic manifestation of the vortex structure, not just the external addition (or lack) of electrostatic load to the surface of close or open vortices.

2.2. The space between the two vortex elements (vacuum) is full of elementary vortices that are exactly like the main open vortices.

The main transverse link (3) is between the accelerating (2) and the decelerating (1) open vortex . The main decelerating vortex (a_1 <0) of the decelerating element (1) emits elementary vortices (5) in the space around this object (1), and the main accelerating vortex (a_2> 0) of the accelerating element (2) sucks these elementary vortices (6). Thus a reverse movement appears (4) *(feedback)* from the decelerating (1) to the accelerating (2) element in the empty space between the two elements. *The direction (4) is opposite* to the main transmission (3) on the main connection of the accelerating (2) to the decelerating (1) element(Figure 1). *The sign of the feedback (4) is positive*, because the more powerful is the main transmission (3), the more powerful is the counter transmission (4) to the full saturation (Figure 1).

<u>Conclusion</u>: *The primary decelerating transverse vortices (5) are emitted (outside) by the main decelerating vortex(1) and the primary accelerating transverse vortices (6) are sucked by the main accelerating transverse vortex (2) by means of the positive feedback (4)* .

The primary transverse vortices (5,6) are similar to the secondary or main transverse vortices (1, 2), but are in another - smaller measuring scale . Thus, the secondary- main (1, 2) and the primary -elementary (5.6) transverse vortices form a sort of fractal structures in 2D (Figure 1)

2.3. Difference in the form and distribution of the mass of the two vortex objects

2.3.1. The form.

The decelerating object (1) is created as a movement (E2D-) outside-in. The internal primary decelerating transverse vortex (15) towards the periphery (Per.1) of the body (1) is with less amplitude but the linear speed (16) is with much greater amplitude. The internal primary decelerating transverse vortex (17) to the center (p.F1) of the body (1) is with more amplitude but the linear speed (18) is with less amplitude. Hence they form a greater density to the periphery of the body (1) or form a ring (Figure 1a).

Due to the nature of the pair vortex objects the accelerating object (2), is established as a movement (E2D +) inside-out . The internal primary accelerating transverse vortex (11) and the linear speed (12) are with less amplitude towards the center

(p.F2) of the body (2) .But the internal primary accelerating transverse vortex (13) and the linear speed (14) are with more amplitude to the periphery (Per.2) of the body (2) .Hence they

form a higher density to the center of the body (2) or form a sphere(Figure 1b). .

<u>Conclusion 1:</u>*The* internal primary decelerating transverse *vortices (15,17) are emitted (inward) by the secondary-main decelerating vortex (1) and the* internal primary *accelerating vortices (11,13) are sucked (inside-out)by the secondary-main acceleratory transverse vortices (2).*

The internal primary transverse vortices (11,13;15,17) are similar to the secondary- main transverse vortices (1, 2), but are in another - smaller measuring scale . Thus, the secondary (1, 2) and the primary (11,13;15,17)) transverse vortices form a sort of fractal structures in 2D (Figure 1).

Conclusion 2: The accelerating object (2) is more like a dense solid sphere (Figure 1b), while the decelerating object (1) is more like an empty ring (or a thoroid)(Figure1a).

2.3.2. The distribution.

The external primary vortices (5) are transmitted by the decelerating element (1), (a_1 <0). They take away mass from it and therefore the decelerating element (1) has a strongly reduced mass (m_1). The external primary vortices (6) are sucked by the accelerating element (2), (a_2> 0).They add to its initial mass and thus the accelerating element (2) has a much greater mass (m_2) compared to the mass of the decelerating element (m_1) (Figure 1). Both vortex objects differ significantly in internal structure and should not be measured in the same manner. The difference in mass is not only quantitative but also qualitative. Paragraph 2.2 and 2.3.1 show that the accelerating element (1) sucks primary vortices (6) and accumulates the main mass (m_2) in itself. As the accelerating element (2) is generated in the direction inside-out by the longitudinal vortex (8), it accumulates and concentrates this basic mass (m_2) at its center (p.F2) (Figure1b).

Conclusion 1: The accelerating object (2) with mass m_2 is heavy, dense and full. The maximum of its mass is to the center (p.F2) and the minimum of the mass is to the periphery (Per.2) .

Paragraph 2.2 and 2.3.1. also show that the decelerating element (1) emits primary vortices (5) outwards and emits a considerable mass away from its main mass (m_1) .As the decelerating element (1) is generated in the direction outside-in and accumulates the remaining mass (m_1) only in the periphery (Per.1) its center remains as if it is" empty" (Figure 1a).

Conclusion 2: The decelerating object (1) with mass m_1 is light, empty and hollow, with a maximum of mass at the periphery (Per.1) and the minimum of the mass is to the center (p.F1) .

Conclusion 3: The accelerating element (2) draws the majority of primary vortices (5) and (6) through the feedback (4) due to the suction effect of the accelerating vortex, and thus it "bares" the greater part of the space around the decelerating element (1) (Figure1).

2.4. Difference in the reflection of the light of two vortex objects and the link between them.

2.4.1. Two objects.

As we know light is distributed evenly in space in the form of transverse electromagnetic wave [4]. Both vortex objects (1) and (2) are also created by transverse waves but uneven transverse waves. One of the objects is generated by a transverse accelerating (2) and the other is created by a transverse decelerating wave (1). Therefore the two vortex objects and the light are similar and homogeneous and that is why these objects will reflect the electromagnetic light wave in an adequate manner (Figure 1).

Conclusion : Both vortex objects (1) and (2) will be visible as they are: the accelerating object (2) will be more visible ,as a large and dense sphere and the decelerating object (1) will be less visible , as an empty and light ringlet(Figure 1).

2.4.2. The link.

The link (3)between the two vortex objects (1,2) is not transverse, but longitudinal. It is a longitudinal vortex[2,3]. *If* the dimension of section of this longitudinal vortex is commensurable with the length of the electromagnetic wave of light, *and when* the transverse electromagnetic wave (called light) meets this longitudinal thread of link (3), then the wave will diffract around the longitudinal thread i.e. it will wind round and will continue to move in the original direction ,with the initial speed and intensity. So the longitudinal vortex (3) will conduct energy from (2) to (1) but it is invisible . It is something like an invisible energy (Figure 1).

Conclusion : The light will not be reflected, refracted or bent by the longitudinal vortex (3) and we, as external observers, will not see anything.

2.4.3. The feedback.

The reverse link (4) between the two vortex objects (1) and (2) is neither transverse nor longitudinal, and is realized by the movement of primary vortices (5) and (6) (Figure 1).

If the dimensions of the elementary primary vortices (5,6) are commensurable with the length of the electromagnetic wave, *and when* the electromagnetic wave meets these primary vortices, then it will diffract around them i.e. it will wind round them and will continue to move in the initial direction, speed and intensity. The external primary vortices (5) and (6), forming the reverse link (4) are also invisible, but conduct matter(not energy) i.e. they represent a sort of invisible matter (Figure 1).

Conclusion : The external primary vortices (5) and (6), filling the space between the two vortex objects (1) and (2) and generating the reverse link as a feedback (4) between them, are also invisible to the external observer.

Therefore, we as external observers, will see the accelerating object (2) as a thick and heavy sphere; the decelerating object (1) as a light and empty ringlet, but we will not see any of the links between them: neither the direct link (3), nor the reverse link (4) connection (Figure 1).

2.4. Pulsing (breathing) of the whole system in time.

The accelerating (2) and the decelerating (1) objects pulse in time by shortening and stretching, both in terms of a longitudinal component (7,8) and a transverse component (9,10). The reason for pulsing modulation comes outside. It forces the generating longitudinal vortex (8) of the accelerating object (2) to pulse.

- Thus, when the generating longitudinal vortex (8) gets an impulse from outside ,it *extends.* The accelerating transverse vortex (2) *expands* ,the longitudinal vortex link (3) *extends* , the decelerating transverse vortex (1) *shrinks* and the resulting longitudinal vortex (7) *extends*. The accelerating element (2) at this condition look as if it has a large and inflate body, The decelerating element(1) at this condition look as if it has a small and shrink body(Figure1) .

- And vice versa, when the generating longitudinal vortex (8) *shortens*, the accelerating transverse vortex (2) *shrinks*, the connection of longitudinal vortex (3) *shortens*, the decelerating transverse vortex (1) *expands* and the resulting longitudinal vortex (7) *shortens* .The accelerating element (2) at this condition look as if it has a small and shrink body .The decelerating element(1) at this condition look as if it has a large and inflate body(Figure1*).*

Conclusion: The accelerating (2) and the decelerating (1) element as well as the connection (3) between them pulsate (breathe) in time. The generating longitudinal vortex (8) shortens or extends and causes contraction or expansion of the transverse vortex (2) and thus shortening or extending of the longitudinal link (3), which causes contraction or expansion of the transverse vortex (1) and the shortening or extension of the resulting longitudinal vortex (7) .

III. The Decelerating Element Revolves Around The Accelerating One [6; P.65-75]

3.1 The open decelerating element is eccentric, but not concentric

In the decelerating element (1) the linear speed (16) at the periphery(Per.1) is greater than the linear speed(18) to the center(p.F_1) towards the more internal turn (Figure 1a) .Moreover the speed V_1 in point 1(1) is greater than the speed V_2, at its opposing point 2 (2) . So $V_1 > V_2$, and the speed V_3 in point 3 (3) is greater than the speed V_4 in the opposite point 4(4) i.e.: $V_3 > V_4$ (Figure 2a). In the perpendicular direction V_5 in point 5(5) is greater than V_6 in point 6(6) i.e.: $V_5 > V_6$ and etc. (Figure 2a) .This dynamics has shown that the transverse turns will be drawn to the higher speed i.e. to V_1 (upwards) and V_5 (left)(when observer is against the body) .The geometric center (p. O) will shift to the new place or to the gravity center(p.F_1) .The distance between the two centers (p. O – p. F_1) will be (F_L -). So the decelerating vortex (1) will thicken generally to the point 7 and point 8 of periphery and will be diluted to point 9 and point 10 of periphery. So the center will shift from geometric center O (p.O) upwards and left to the gravity center F (p.F_1). The power of eccentricity (F_L-) will be proportional to the distance(p.O—p.F_1) from geometric center (p. O) to the gravity center (p.F_1) (Figure 2a; Figure 3a).Therefore:

(F_L-) ~ (p.O—p.F_1)

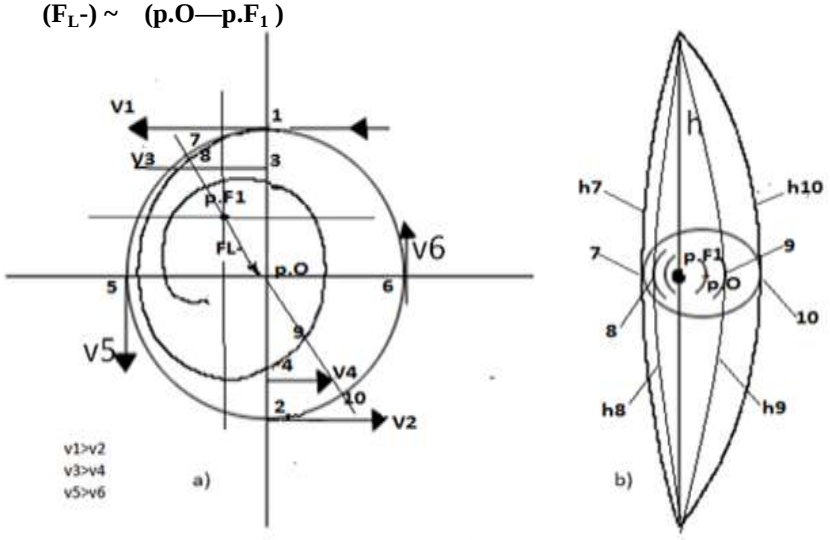

Figure 2.

3.2. The open accelerating element is eccentric too (not concentric)

By the same logic the center of the accelerating vortex (2) will be drawn to the higher speed: up and right (when observer is against the sketch) (Figure 3b).

Conclusion: Drawing to the center of the accelerating vortex (2) up and right (F_L+) (Figure3b) is opposite to the shift of the center of the decelerating vortex (1), which is pulled up and left (F_L-)(when observer is against the sketch) (Figure3a).

3.3. Mutual disposition of the accelerating and the decelerating eccentric vortex objects.

3.3.1. Eccentricity (F_L).

The accelerating element (2) is much denser to the center, than the decelerating (1) is much denser to periphery. The accelerating element (2) has a lack of space in center (Figure 1a). So the shift of the center of the accelerating element (F_L+) is much less(Figure3b) than a shift of the center of the decelerating element (F_L-)(Figure3a) . The shift (F_L-) from the center of the decelerating vortex from point O(p.0) *up and left* to point F_1 (p .F_1) (Figure 3a) will be much greater than the shift (F_L+) from the center of the accelerating vortex from point O (p.O) *up and right* to point F_2 (p.F_2) (Figure 3b). Therefore:

(FL-) □ (FL+) .

This means that when (F_L-) and (F_L+) decompose horizontally and vertically: the horizontal (F_1-) and vertical vector (F_2-) of the shift (F_L-) of the decelerating element(1) will also be larger than the horizontal (F_1+) and vertical vector (F_2+) of the shift (F_L+) of the accelerating element (2), i.e. (Figure 3).Therefore:

(F_1-) > (F_1+) ; (F_2-) > (F_2+) .

Conclusion1: The decelerating element (1) has a greater shifted center, greater eccentricity and greater force of eccentricity (F_L-). This force (F_L-) is directed from the gravity point (p. F_1) to the point of the geometric center (p. O) and is decompose into two perpendicular to each other components: the first one (F_1-) is aimed to the accelerating element (2) and the second one (F_2 -) is perpendicular (in a plan of view from the top downwards) and it is situated on the right of the first (Figure 3a).

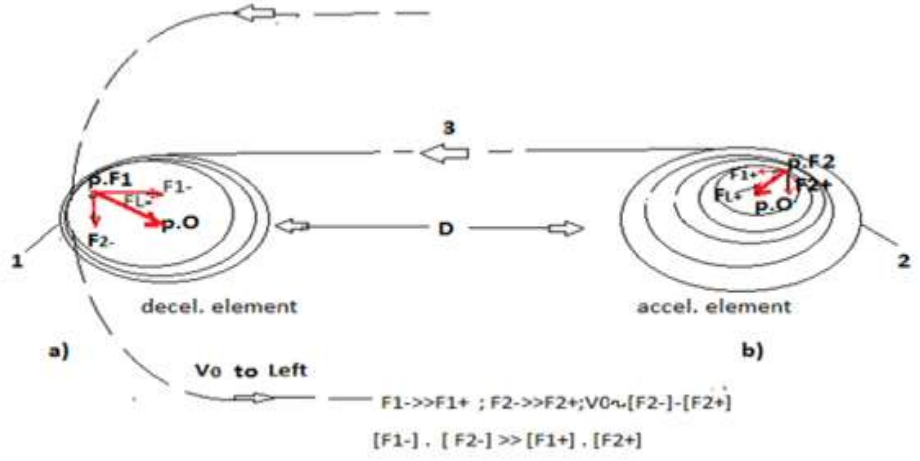

Figure 3.

Conclusion 2: The accelerating element (2) has a less shifted center, less eccentricity and a smaller force of eccentricity (FL +). This force (FL +) is directed from the point of eccentricity (p. F) to the point of the geometric center (p. O) and is decomposed into two perpendicular to each other components: the first one (F1+) is directed to the decelerating element (1) and the second one (F2 +) is perpendicular (in a plan of view from the top downwards) and it is situated on the left of the first (Figure 3b).

3.3.2. Distance (D).

The power of eccentricity (F_L) is decomposed into two components: (F_1) and (F_2). Thus, we obtain that (F_1-) of the decelerating element (1) is in the opposite direction (F_1+) of the accelerating element (2) and is larger in absolute value (Figure 3). Therefore :

|F_1-|>|F_1+|.

Since (F_1-) and (F_1+) are in opposite directions and face each other, they precisely determine the distance (D) between the accelerating (2) and the decelerating (1) vortex (Figure 3).

Conclusion : The distance between the two vortex elements (D) is proportional to the sum of absolute value each of the two forces (F_2-) and (F_2+) , with which they push one another away :

D~ | F2- □ + □F2+|.

3.3.3. Speed (V_0) .

On the other hand the force (F_2 -) of the decelerating element (1) and the force (F_2+) of the accelerating element (2) is one-way, but also (F_2-) is greater than (F_2+) in absolute value as we show in paragraph 3.3.1 :

$$| F_2- | > | F_2+ |.$$

This is the cause, the decelerating element (1) to turn at a certain speed (V_0) (Figure 3a) around the accelerating element (1) (Figure 3b).

Conclusion : The speed of movement (V_0) of the decelerating element (1) around the accelerating element (2) is proportional to the difference of absolute value of the two forces (F_2-) and(F_2+)(Figure 3) :

$$V_0 \sim |F_2- \square - \square F_2+ \square .$$

3.3.4. Pulsing in time (T) .

Paragraph 2.5. shows that the decelerating element (1) does not rotate in a circle, but in an ellipse around the accelerating element (2) due to pulsation of the whole system over time. The generating longitudinal vortex (8) should do one periods (contractions and two extensions) so that the decelerating object (1) makes *one turn in an ellipse* around the accelerating object (1) (Figure 1;Figure 3).

Conclusion : The decelerating element (1) describes a full ellipse around the accelerating element (2) for one period of the generating vortex (8) .

IV. The Open Vortices Rotate In Around Their Own Axes, Too.

4.1. The rotation of the decelerating element around its axis by internal primary vortices.

4.1.1. The internal primary vortices.

From the paragraph 2.3.1. we realize that the internal primary vortices(3) are resulted by the secondary-main vortices (1,2). They (3) have the same shape and dynamics as the main vortices(1,2) but in the smaller scale. For example ,the main accelerating vortex (2) has accelerating primary vortices (3) and the main decelerating vortex (1) has decelerating primary vortices (3) (Figure 4).

4.1.2. Directions.

Inside the decelerating element (1) there is a large number (n_1) of powerful in amplitude (W_1) *internal primary vortices* (3) (Figure4a).They are closed inside and can't be emitted outside into the surrounding area as *external primary vortices*(5) to form the free elementary vortices and to be involved in the feedback(4) (Figure 1) . For the decelerating element these *internal primary* vortices(3) with amplitudes (W_1) *are curved to the left (3)* and rotate the decelerating element (1) to the left (4) with velocity (w_1) (Figure 4a).The direction*" left"* is at relation to observer standing against the sketch (Figure 4).

Conclusion : The direction of the rotation of the decelerating element (1) around its axis is to the left (4) and the magnitude of the speed (w_1) of the rotation is proportional to the product of the number (n_1) and the amplitude (W_1) of the internal primary vortices (3) (Figure 4a) *.Therefore :*

$$w_1 \sim n_1 . W_1 .$$

4.2 The rotation of the accelerating element around its axis by secondary vortices.

Inside the accelerating element (2) there are also *internal primary* vortices (3), though much fewer in number (n_2) and with a much smaller amplitude (W_2)(Figure 4b). They are closed and can not be involved in the feedback (4) (Figure 1). These *internal primary* vortices (3) with amplitudes (W_2) *are curved to the right* (3) and rotate the accelerating element (2) at a speed (w_2) to the right (4) (Figure 4b). The direction*" right"* is at relation to observer standing against the sketch (Figure 4).

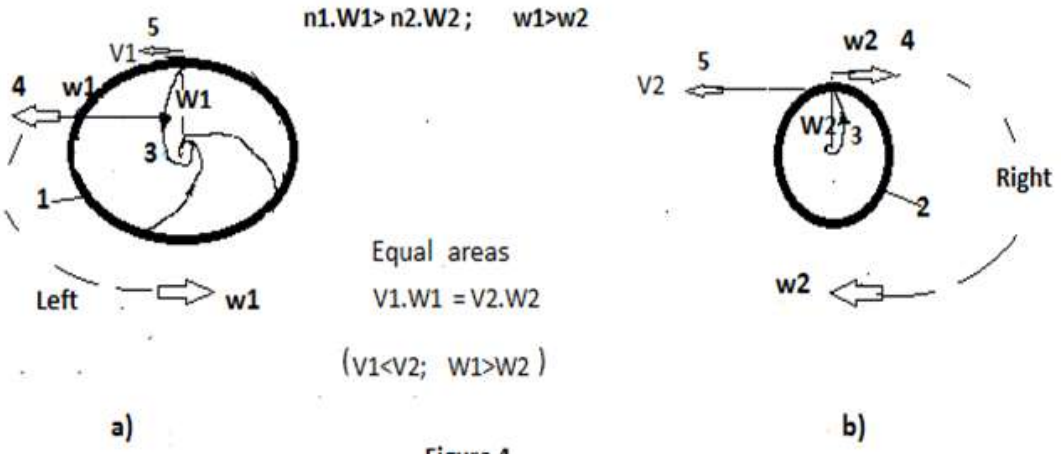

Figure 4.

Note : "Left- right" directions are in relation to observer standing against the sketch on the paper.
Conclusion: The direction of the rotation of the accelerating element around its axis (2) is to the right (4) and the magnitude of the speed (w_2) of the rotation is proportional to the product of number (n_2) and the amplitude (W_2) of the internal primary vortices (3) (Figure 4b) *:*

$$w_2 \sim n_2 . W_2 .$$

4.3 Difference in the speed of rotation around the axis of the decelerating and the accelerating elements.
Inside the decelerating element (1), the number (n_1) and the amplitude (W_1) of the *decelerating internal primary* vortices (3) are much larger than the number (n_2) and the amplitude (W_2) of the *accelerating internal primary* vortices (3) of the accelerating element (2) (Figure 4b) Therefore :

$$n_1 > n_2; \quad W_1 > W_2, \quad \text{or} \quad n_1.W_1 > n_2.W_2.$$

Conclusion: Since the speed around the axis (w_1) of the decelerating element (1) is proportional to the product ($n_1.W_1$), and the speed around the axis (w_2) of the accelerating element (2) is proportional to the product ($n_2.W_2$), and $n_1 > n_2$ and $W_1 > W_2$, then the decelerating element rotates much faster than the accelerating one i.e. :

$$w_1 > w_2.$$

V. General Conclusions.

5.1 The internal structure of the accelerating and the decelerating elements are the reason for their properties.
5.1.1. **The acceleration** is the same at the output of the accelerating element and at the input of the decelerating element. The acceleration is the reason for *"the charge"* of the two elements. Because of the acceleration, the decelerating element emits external primary vortices ,while the accelerating element sucks external primary vortices .These external primary vortices fill the space (vacuum) between the elements and form a feedback between them. The acceleration is the reason why the accelerating element has the form of a *solid thick sphere* and the deceleration – has the form of an *empty light ring* (thoroid) (Figure 1).
5.1.2. The eccentricity of two elements and the fact that the eccentricity of the decelerating element is greater than the eccentricity of the accelerating element is the reason why the *decelerating element turns around the accelerating element(Figure 2,Figure 3)*.
5.1.3. The pulse in time of the two elements and the connection between them is the reason why the decelerating element rotates *in an ellipse* (not a circle) around the accelerating element. The decelerating element makes one complete revolution in an ellipse around the accelerating element for one period of the generating vortex of the accelerating element (Figure 1).
5.1.4. The primary internal open vortices are primary open vortices targeted inside the elements . They have different accelerations and different directions of rotation cause both elements *to rotate around their axes.* The fact that the vortices of the decelerating element are more in number and they have a greater amplitude than 11 the vortices of the accelerating element is the cause the *decelerating element to rotate faster around its axis than the accelerating element*. The primary internal cross vortices of the decelerating element are curved *to the left* (from the periphery to the center), and those of the accelerating element are curved *to the right* (from the center to the periphery). So that they rotate the *decelerating element respectively to the left and the accelerating element- to the right(Figure 3,Figure 4).*
5.1.5. **Visibility and invisibility** structures.The open cross vortices of both elements are visible and the open longitudinal vortex of the connection between them is invisible. That is why, so far the two elements were are perceived and are registered one by one, without a connection between them, not as a united, synergistic and sustainable system. Except that the longitudinal vortex of the main connection is invisible *(invisible energy),* but also and primary vortices are invisible. The external primary vortices from the feedback are also invisible *(external Invisible matter) t*he internal primary vortices in the internal space of elements are also invisible *(internal invisible matter) (Figure 1,Figure 3).* .
5.2. Prototypes of gravitational elements. Given an account exhibited properties of gravitational element we should note the following:
5.2.1. Prototype of gravitational acceleration element is the proton (p+) in the Atom system and Sun in the solar system.
5.2.2. Prototype of gravitational decelerating element is the electron (e -) in the Atom system and Earth in the solar system

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